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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/688,254	10/16/2003	Michael L. Lightstone	NVID-072/00US	4561

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EXAMINER	
RAO, ANAND SHASHIKANT	
ART UNIT	**PAPER NUMBER**
2621	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/26/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/688,254	LIGHTSTONE ET AL.	
	Examiner	Art Unit	
	Andy S. Rao	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/07/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

A). Page 3, lines 22-32, the specification is missing (due to scanning artifacts). Applicant is requested to submit the occluded portions of the specification.

B). Page 10, line 23, "intra-energy estimates 9" should be "intra-energy estimates 8".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Ribas-Corbera.

Ribas-Corbera discloses a rate controller for a block-based video encoder (Ribas-Corbera: figure 5), comprising: a variable bit rate (VBR) controller generating a first quantization step size (Ribas-Corbera: column 11, lines 45-52); a constant bit rate (CBR) controller generating a second quantization step size (Ribas-Corbera: column 11, lines 1-10); and a selector configured to select a maximum permissible quantization step size from said first quantization step size and said second quantization step size for use by a quantizer in quantizing transform data (Ribas-Corbera: column 8, lines 25-45), as in claim 1.

Regarding claim 2, Ribas-Corbera discloses an input for processing at least one parameter of operation for at least one of said VBR controller and said CBR controller (Ribas-Corbera: column 4, lines 35-40), as in the claim.

Regarding claim 3, Ribas-Corbera discloses wherein said at least one parameter includes at least one of a target peak bit rate (Ribas-Corbera: column 7, lines 15-20), a target average bit rate (Ribas-Corbera: column 7, lines 10-11), a maximum quantization scale (Ribas-Corbera: column 7, lines 30-35), a minimum quantization scale (Ribas-Corbera: column 7, lines 50-60), a target quantizer scale, a target buffer scale, a VBV buffer size, and a time constant for said VBR rate controller to track changes in long-term average bit rate (Ribas-Corbera: column 6, lines 1-10), as in claim 3.

Regarding claims 4-6, Ribas-Corbera discloses wherein an average bit rate of said VBR controller tracks variations in long-term average bit rate of an output bit stream of said video compression encoder (Ribas-Corbera: column 7, lines 49-53), as in the claims.

Regarding claim 7, Ribas-Corbera discloses wherein said CBR controller comprises: a picture analysis module configured to classify macroblocks of a current picture into at least two different macroblock types and calculate a statistical indicator of complexity for each macroblock type (Ribas-Corbera: column 4, lines 40-50); a complexity model module coupled (Ribas-Corbera: column 5, lines 8-13) to said picture analysis module configured to form a predicted picture complexity estimate based on a statistical frequency of said macroblock types within said current picture (Ribas-Corbera: column 9, lines 20-25); a bit allocation module adapted to form a bit allocation consistent with said predicted picture complexity estimate (Ribas-Corbera: column 5, lines 45-55); and a picture-level quantizer assignment module

adapted to assign a quantization step size consistent with said bit allocation (Ribas-Corbera: column 6, lines 20-35), as in claim 7.

Regarding claim 8, Ribas-Corbera discloses wherein said indicator of complexity comprises an energy value calculated from an activity measurement of macroblocks (Ribas-Corbera: column 1, lines 45-55), as in the claim.

Regarding claim 9, Ribas-Corbera discloses wherein said bit allocation module comprises: an ideal bit allocation module configured to calculate an ideal bit allocation based on an estimated complexity of a picture (Ribas-Corbera: column 4, lines 35-40); a video bitstream verification (VBV) fullness adjustment module configured to adjust said ideal bit allocation to maintain a desired VBV buffer fullness range (Ribas-Corbera: column 12, lines 5-20); and a VBV compliance adjustment module configured to adjust said ideal bit allocation to maintain VBV compliance (Ribas-Corbera: column 6, lines 5-10), as in the claim.

Ribas-Corbera disclose a constant bit rate controller for a video compression encoder (Ribas-Corbera: figure 5; column 11, lines 1-10), comprising: a picture analysis module configured to classify macroblocks of a current picture into at least two different macroblock types and calculate a statistical indicator of complexity for each macroblock type (Ribas-Corbera: column 4, lines 40-50); a complexity model module coupled (Ribas-Corbera: column 5, lines 8-13) to said picture analysis module configured to form a predicted picture complexity estimate based on a statistical frequency of said macroblock types within said current picture (Ribas-Corbera: column 9, lines 20-25); a bit allocation module adapted to form a bit allocation consistent with said predicted picture complexity estimate (Ribas-Corbera: column 5, lines 45-

55); and a picture-level quantizer assignment module adapted to assign a quantization step size consistent with said bit allocation (Ribas-Corbera: column 6, lines 20-35), as in claim 10.

Regarding claim 11, Ribas-Corbera discloses wherein said bit allocation module comprises: an ideal bit allocation module configured to calculate an ideal bit allocation based on an estimated complexity of a picture (Ribas-Corbera: column 4, lines 35-40); a video bitstream verification (VBV) fullness adjustment module configured to adjust said ideal bit allocation to maintain a desired VBV buffer fullness range (Ribas-Corbera: column 12, lines 5-20); and a VBV compliance adjustment module configured to adjust said ideal bit allocation to maintain VBV compliance (Ribas-Corbera: column 6, lines 5-10), as in the claim.

Regarding claims 12-13, Ribas-Corbera discloses wherein said indicator of complexity comprises an energy value for each macroblock type (Ribas-Corbera: column 1, lines 45-55), as in the claims.

Regarding claims 14-15, Ribas-Corbera discloses wherein said complexity model module (Ribas-Corbera: column 5, lines 8-12) generates a measurement of the complexity of each type of macroblock and a running estimate of macroblock type complexities (Ribas-Corbera: column 20-25), as in the claims.

Ribas-Corbera discloses a method of constant bit rate (CBR) rate control in a video compression encoder (Ribas-Corbera: figure 6), comprising: for a current picture (Ribas-Corbera: column 9, lines 15-20: current picture contained in "current GOP"), determining a statistical frequency of macroblock types (Ribas-Corbera: column 4, lines 35-40); generating a statistical indicator indicative of a complexity of each macroblock (Ribas-Corbera: column 5, liens 20-25); predicting picture complexity to form a predicted picture complexity by forming a

weighted sum of macroblock types (Ribas-Corbera: column 9, lines 20-25), wherein each macroblock type has a weight that increases with its statistical frequency and with a value of said statistical indicator (Ribas-Corbera: column 4, lines 50-55); and generating a bit allocation consistent with said predicted picture complexity (Ribas-Corbera: column 5, lines 50-55); and type of assigning a quantizer step size consistent with said bit allocation (Ribas-Corbera: column 6, lines 20-43), as in the claim.

Regarding claims. 17-20, Ribas-Corbera discloses generating a measurement of the complexity of each type of macroblock (Ribas-Corbera: column 4, lines 34-39), as in the claims.

Regarding claims 21-22, Ribas-Corbera discloses generating a running estimate of macroblock type complexities (Ribas-Corbera: column 9, lines 15-25), as in the claims.

Regarding claim 23, Ribas-Corbera discloses wherein said values of said previous picture are weighted (Ribas-Corbera: column 4, lines 50-54) by an aging factor (Ribas-Corbera: column 4, lines 60-65), as in the claim.

Regarding claims 24-26, Ribas-Corbera discloses generating an intra energy output for bit prediction in a video bitstream compliance check (Ribas-Corbera: column 11, lines 50-65), as in the claims.

Ribas-Corbera discloses a method (Ribas-Corbera: figure 6) of variable bit rate control in a video compression encoder (Ribas-Corbera: figure 5) having a variable bit rate controller (Ribas-Corbera: column 11, lines 45-52) with a peak bit rate (Ribas-Corbera: column 7, lines 15-20) and a selectable average bit rate (Ribas-Corbera: column 9, lines 15-20), comprising: measuring changes in long-term average bit rate of an output bitstream of said encoder (Ribas-Corbera: column 7, lines 49-52); and adjusting said average bit rate of said variable bit rate

controller to track said changes in long-term average bit rate (Ribas-Corbera: column 7, lines 55-65), as in claim 27.

Regarding claim 28, Ribas-Corbera discloses wherein said adjusting comprises: adapting to said changes in long-term average bit rate according to a time constant (Ribas-Corbera: column 10, lines 50-60), as in the claim.

Regarding claim 29, Ribas-Corbera discloses wherein said adjusting comprises: adapting to said changes in long-term average bit rate according to a proportional integral controller response (Ribas-Corbera: column 12, lines 55-67), as in the claim.

Ribas-Corbera discloses a method of rate control (Ribas-Corbera: figure 6) in a video compression encoder (Ribas-Corbera: figure 5), comprising: generating a first quantization step size using a constant bit rate encoder (Ribas-Corbera: column 11, lines 1-10); forming a second quantization step size using a variable bit rate encoder (Ribas-Corbera: column 11, lines 45-53); and selecting a maximum quantization step size for use in quantizing compressed video data (Ribas-Corbera: column 8, lines 25-45), as in the claim.

Regarding claims 31-32, Ribas-Corbera discloses wherein said forming comprises: tracking long-term average bit rates using a proportional integral encoder (Riba-Corbera: column 12, lines 55-67), as in the claim.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Vetro discloses an adaptable bitstream video delivery system. Boice discloses a real-time encoding of video sequences. Tabatani discloses a bit-rate control mechanism for digital

image and video data compression. Yu discloses a rate control picture based lookahead window. Noh discloses an apparatus and method for controlling variable bit rates in real time.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andy S. Rao whose telephone number is (571)-272-7337. The examiner can normally be reached on Monday-Friday 8 hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571)-272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Andy S. Rao
Primary Examiner
Art Unit 2621

asr
March 22, 2007